

WHAT IS CLAIMED IS:

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1. A semiconductor integrated circuit,  
comprising:

10 a current generator circuit that generates  
a first current substantially proportional to an  
absolute temperature, the first current being  
determined by a size ratio of a MOS transistor, and  
by a resistor; and

15 a starting-up circuit that causes said  
current generator circuit to generate the first  
current at a stable working point of said current  
generator circuit,

wherein

20 while said current generator circuit  
operates at the stable working point, a current that  
flows through said starting-up circuit is determined  
by a diffusion resistance and a MOS transistor  
connected in series.

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2. The semiconductor integrated circuit as  
claimed in claim 1, further comprising:

30 a voltage generator circuit that generates  
a reference voltage substantially independent of the  
absolute temperature using the first current  
generated by said current generator circuit.

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3. The semiconductor integrated circuit as

claimed in claim 2,

wherein

said voltage generator circuit comprises:

one of a bipolar transistor and a diode;

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a resistor connected to said bipolar transistor or said diode; and

said voltage generator generates the reference voltage by flowing a second current  
10 proportional to the first current through a series of the one of the bipolar transistor and the diode, and the resistor.

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4. A semiconductor integrated circuit, comprising:

a current generator circuit that generates  
20 a first current substantially proportional to an absolute temperature; and

a voltage generator circuit that generates a reference voltage substantially independent of the absolute temperature using the first current  
25 generated by said current generator circuit,

wherein

said voltage generator circuit comprises:

a first element that generates a voltage that is substantially lineally reduced as the  
30 absolute temperature increases;

a resistance division circuit connected in parallel to said first element;

a second element connected to the parallel connection of said first element and said resistance division circuit, wherein said second element  
35 provides a second current proportional to the first current; and

a third element connected to a node between resistors of said resistance division circuit, wherein said third element provides a third current proportional to the first current.

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5. The semiconductor integrated circuit as claimed in claim 4,  
wherein  
said first element is one of a bipolar transistor and a diode.

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6. The semiconductor integrated circuit as claimed in claim 4,  
wherein  
said current generator circuit generates the first current determined by a size ratio of a MOS transistor, and by a resistor.

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7. A semiconductor integrated circuit, comprising:  
a first NMOS transistor that is provided with a voltage to a gate thereof, which voltage is generated by dividing a power supply voltage with resistors;  
a second NMOS transistor that is provided with a reference voltage to a gate thereof;  
a first PMOS transistor and a second PMOS transistor diode-connected to each other;

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a third PMOS transistor, a gate of which is connected to a gate electrode of said first PMOS transistor;

5 a fourth PMOS transistor, a gate of which is connected to a gate electrode of said second PMOS transistor;

a third NMOS transistor connected as a diode;

10 a fourth NMOS transistor, a gate of which is connected to the gate of said third NMOS transistor; and

a first resistor,  
wherein

15 a source electrode of said first NMOS transistor and a source electrode of said second NMOS transistor are connected together;

a drain of said first NMOS transistor and a drain of said first PMOS transistor are connected together;

20 a drain of said second NMOS transistor and a drain of said second PMOS transistor are connected together;

25 a drain of said third PMOS transistor and a drain of said third NMOS transistor are connected together;

a drain of said fourth PMOS transistor and a drain of said fourth NMOS transistor are connected together;

30 a first end of said first resistor is connected to the power supply voltage;

a second end of said first resistor is connected to the drain of said fourth PMOS transistor and to the drain of said fourth NMOS transistor; and

35 the semiconductor integrated circuit outputs a voltage of the second end of said first resistor for determining whether the power supply

voltage is lower than a predetermined voltage.

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8. The semiconductor integrated circuit as claimed in claim 7,

wherein

the reference voltage is generated by the  
10 semiconductor integrated circuit as claimed in claim 2.

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9. A semiconductor integrated circuit, comprising:

a first pnp bipolar transistor;

a second pnp bipolar transistor;

20 a first resistor connected in series to an emitter of said first pnp bipolar transistor;

a second resistor connected in series to an emitter of said second pnp bipolar transistor;

a third resistor connected in series to an  
25 end of said first resistor, resistance of said third resistor is equal to the resistance of the second resistor;

an operational amplifier that is provided with a voltage generated by level-shifting an  
30 emitter voltage of said second pnp bipolar transistor to a positive direction with said second resistor as a first input, and with a voltage generated by level-shifting a voltage at the end of said first resistor to a positive direction with  
35 said third resistor as a second input,

wherein

said operational amplifier receives the

first input and the second input as a gate input of a differential pair of NMOS transistors, and is negatively fed back so that a voltage of the first input and a voltage of the second input are equalized.

- 10                    10. The semiconductor integrated circuit as claimed in claim 9, further comprising:
- a voltage generator circuit that generates a reference voltage substantially independent of an absolute temperature using a first current flowing
  - 15                    through said first pnp bipolar transistor, wherein
  - said voltage generator circuit further comprises:
  - a first element that generates a voltage
  - 20                    that is substantially linearly reduced as the absolute temperature increases;
  - a resistance division circuit connected in parallel to said first element;
  - a second element that provides a second
  - 25                    current proportional to the first current, said second element connected in parallel to the parallel connection of said first element and said resistance division circuit; and
  - a third element that provide a third
  - 30                    current proportional to the first current, the third element connected to a node between resistors of said resistance division circuit.